DOCUMENT RESUME

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ABSTRACT

The MARKTF-M3 computer program, written in FORTRAN IV, scores tests (consisting of true-or-false statements about concepts or facts) by comparing the list of true or false values prepared by the instructor with those from the students. The output consists of separate reports to each student advising him of (1) his performance with respect to four categories of information in the test statements, (2) his over-all score on the test, and (3) his current standing in the course. This program allows the instructor considerable latitude in designing the categories of information in the test and composing the statements that the machine will select. It has been found useful also in testing prerequisite knowledge of basic sciences, logic and mathematics, in classes of students newly enrolled in a course of study such as physical geology. The method used to input the data and the processing of data are discussed; the data deck is described in detail; and a listing of the punched card decks of the main program and decoding subroutine and of the equivalent column-binary compiled decks with a typical data deck are provided. Specimen output of reports to students about their performance is provided. An 81-item term test for Geology 116 at the University of Toronto is included. (For related documents, see TM 002 778, 790-793.) (Author/DB)

DEPARTMENT OF GEOLOGY
UNIVERSITY OF TORONTO
TORONTO, ONTARIO
CANADA

Information on computer programs of the PEDAGE system, for use in scoring and analyzing methods of teaching and examining knowledge of factual material.

MARKTF-M3-F4

December 30, 1965

University of Toronto
Department of Geology

Computer program--- MARKTF-M3

Written in FORTRAN IV source language.

For IBJOB compiler, IBSYS monitor, IBM 7094-II computer.

Conforms to current conventions of the Institute of Computer Science, University of Toronto.

Purpose. This program scores tests (consisting of true-or-false statements about concepts or facts) by comparing the list of true or false values prepared by the instructor with those from the students. The output consists of separate reports to each student advising him of 1) his performance with respect to four categories of information in the test statements, 2) his over-all score on the test, and 3) his current standing in the course. This program allows the instructor considerable latitude in designing the categories of information in the test and composing the statements that the machine will select. It has been found useful as an introductory program for classes unfamiliar with machine-processing of examinations. It has been found useful also in testing prerequisite knowledge of basic sciences, logic and mathematics, in classes of students newly enrolled in a course of study such as physical geology.

Method. The instructor composes statements that are true or false in equal numbers and estimates the content of four separate categories of information that are in each statement. These relative weights, or loadings, usually are in the form of decimal fractions that total 1.0 for each statement, but each statement can be arbitrarily weighted by loadings that total more or less than 1.0. The loading values for four categories for each statement are punched into data cards as specified below.

The student responses are assumed to be on mark-sense cards (FGS system of triple-row coding), and these must be read and punched such that the 27 mark-sense columns are punched in the left-most set of 27 columns of an 80-column cards. The instructor prepares a similar card with the correct T/F array.

Other information in the student cards and in control cards, are discussed below.

The main program reads the coded information derived from the mark-sense punching and the subroutine decodes this into a T/F array. This is done on the instructor's control data and then on each of the student cards in sequence. The data on any one student card is matched with the instructor's control data and a sum of number of matches minus number of mismatches is converted to percent of the number of statements. At the same time, subscores for each of the four categories are computed in an analogous way, but instead of printing the subscores, the machine selects one of ten statements to print as a messageto the student. The text of the statements

is composed by the instructor and is part of the data deck. The messages are those the instructor thinks suitable for scores below 10%, 10 to 20%, etc., and generally would be different for each test.

The pattern of mismatching of student and control data is analyzed in a simple way for any significant difference between number of true and false and, as an invariant part of the program, the machine prints one of three messages as detailed below. This scheme detects a strong tendency to mark true if the value of the statement is false or the reverse, possibly due to personality traits of submissiveness or aggression, respectively.

Finally, each score on the test is merged with the corresponding prior mark in the course to give a current percentage mark, and the results for each student are printed on separate pages. These can be trimmed to ordinary page size and distributed in the class.

During processing of student data, the over-all scores are stored and later processed to give the mean score and also data for a histogram plot of the distribution of scores. This is printed on the last page of output.

If the user plans to modify this program he should consider adding a routine that would store student names and corresponding scores and/or current standings and print these out on a separate sheet for the instructor. Using the present program, the current standings are copied into a record book from the reports to the students. These numbers subsequently are punched into a new set of student data cards for the next test.

Another modification that could be made quite easily is provision for alternative outputs such as one for male and another for female students, or two or more languages. This would necessitate a larger data deck but the extra work of preparation might be justified by the increased impact on the student body of the decision-making ability of the computer. The 81st T/F statement could be "Most of my friends consider me to be a female", or "Je prefere lire mon bulletin scolaire en francais", or "I can read simple sentences in Swahili."

We have found that students rapidly become accustomed to machine scoring and commenting, and there seems to be little if any reaction to the inhuman element of the scheme.

Data deck. In more detail, the data deck is made up of cards with the following punched information after the $DATA monitor control card:

1) descriptive title, date, etc., in format (10A6)--1 card;
2) sentence required for the middle of the report, in format (10A6)--1 card;
3) sentence required for the end of the report, in format (10A6)--1 card;
4) start of sentences about the four categories, in format (10A6)--4 cards;
5) ends of sentences about results, in format (10A6)--10 cards;
6) ends of sentence about tendencies, in format (10A6)--3 cards;
7) number of statements (n), and number of students (m) in format (2I3)--1 card;

8) exam number and over-all incrementation (if any) in format (2F7.1)--1 card;
9) instructor's punched MS card, in format (27A1)--1 card;
10) loadings on four categories, in format (4F7.1)--n cards;
11) students's punched MS card with name, prior mark, and individual incrementation (if any), in format (27A1, CAG, F5.2, F4.1)--m cards.

Specimens of student's and instructor's mark-sense cards are illustrated on a following page.

The FORTRAN program, typical data deck and typical output. On the following pages is a listing of the punched card decks of the FORTRAN IV main program and decoding subroutine. In general, users will not require these decks unless they wish to make modification. Following the FORTRAN programs is a listing, on a 407 accounting machine, of the equivalent column-binary compiled decks with a typical data deck. This is the form of the job deck in which the program would be presented, except for an initial identification card as required by the operators of the computer.

Specimen output i.e. reports to students about their performance, are shown on following pages.

The execution time for this program is approximately 0.07 seconds per student tested. The number of formal lines of output computed by the machine is about 27.5 per student. Printing time with an IBM 1460 machine is about 0.033 minutes per student.

```
*IBFTC TEMS01  DECK
C** PROGRAM MARKTF-63-F4 **
C** A PART OF THE PEDAGE SYSTEM **
C** CODED BY E.G.SMITH, DEPT. OF [illegible], UNIV. TORONTO, SEPT. 1965. **
C** SCORES T/F TESTS AND COMMENTS ON [illegible] AND [illegible] FOUR CATEGORIES **
      DIMENSION CODE(27),TAN(81),ANS(81),NAME(5),FREQ(11),WANAL(4,81),
     1 TANAL(4),ANAL(4),LETTER(10,30),MESSAG(10,4),TITLE1(10),TITLE2(10)
     2,TITLE3(10),PSYCHO(10,3)
      LOGICAL TAN,ANS,PUNCH
      READ(5,11) TITLE1,TITLE2,TITLE3
      READ(5,11) MESSAG
      READ(5,11) LETTER
      READ(5,11)PSYCHO
    1 READ(5,12) NSTAT,NSTUD
      RNSTAT=NSTAT
      RINC=100.0/RNSTAT
      READ(5,14) XNUM,ADJUST
      RNSTUD=NSTUD
      RECNUM=1.0/RNSTUD
      AV=0.0
      READ(5,13) CODE
      PUNCH=.TRUE.
      CALL DECODE(CODE,TAN,PUNCH)
      IF(.NOT.PUNCH) GO TO 310
      DO 100 K=1,11
      FREQ(K)=0.0
  100 CONTINUE
      READ(5,14) ((WANAL(J,K),J=1,4),K=1,NSTAT)
      DO 120 J=1,4
      TANAL(J)=0.0
      DO 120 K=1,NSTAT
      TANAL(J)=TANAL(J)+WANAL(J,K)
  120 CONTINUE
      DO 200 N=1,NSTUD
      PUNCH=.TRUE.
      READ(5,15) CODE,NAME,CUMPC,BONUS
      CALL DECODE(CODE,ANS,PUNCH)
      WRITE(6,22)
      WRITE(6,25) NAME
      IF(.NOT.PUNCH) WRITE(6,30)
      DO 125 J=1,4
      ANAL(J)=0.0
  125 CONTINUE
      WRITE(6,25) TITLE1
      SUMTRU=0.0
      SCORE=0.0
      DO 160 K=1,NSTAT
      IF(ANS(K))SUMTRU=SUMTRU+1.0
      IF((TAN(K).AND.ANS(K)).OR.(.NOT.TAN(K).AND..NOT.ANS(K)))GO TO 130
      SCORE=SCORE-RINC
      DO 127 J=1,4
      ANAL(J)=ANAL(J)-WANAL(J,K)
  127 CONTINUE
      GO TO 160
  130 SCORE=SCORE+RINC
      DO 135 J=1,4
      ANAL(J)=ANAL(J)+WANAL(J,K)
  135 CONTINUE
  160 CONTINUE
      AV=AV+SCORE
```

```
      WRITE(6,24) SCORE
      WRITE(6,25) TITLE2
      DO 170 I=1,4
      WRITE(6,25) (MESSAG(I,J),I=1,10)
      ANAL(J)=ANAL(J)/TANAL(J)
      DO 165 M=1,10
      RM=M
      RMD=RM/10.0
      IF(ANAL(J).GT.RMD) GO TO 165
      WRITE(6,25) (LETTER(I,M),I=1,10)
      GO TO 170
  165 CONTINUE
  170 CONTINUE
      WRITE(6,25) TITLE3
      SUMTRU=SUMTRU/RNSTAT
      IF(SUMTRU.LT.0.4) WRITE(6,25)(PSYCHO(K,1),K=1,10)
      IF(SUMTRU.GT.0.6) WRITE(6,25)(PSYCHO(K,2),K=1,10)
      IF((SUMTRU.GE.0.4).AND.(SUMTRU.LE.0.6))
     1 WRITE(6,25)(PSYCHO(K,3),K=1,10)
      DO 180 M=1,11
      RMD=10*(M-1)
      IF(SCORE.GT.RMD) GO TO 180
      FREQ(M)=FREQ(M)+RECNUM
      GO TO 185
  180 CONTINUE
  185 SCORE=((CUMPC+ADJUST)*(XNUM-1.0)+SCORE+BONUS)/XNUM
      IF(SCORE.GT.100.0) SCORE=100.0
      WRITE(6,29) SCORE
      WRITE(6,27)
  200 CONTINUE
      AV=AV/RNSTUD
      WRITE(6,28)
      WRITE(6,25) TITLE1
      WRITE(6,23) AV
      WRITE(6,24) FREQ
      GO TO 1
  310 WRITE(6,31)
      STOP
   11 FORMAT(10A6)
   12 FORMAT(2I3)
   13 FORMAT(27A1)
   14 FORMAT(4F7.1)
   15 FORMAT(27A1,6A6,F5.2,F4.1)
   22 FORMAT(1H1,19X,17HINDIVIDUAL REPORT )
   23 FORMAT(1H0,9X,17HCLASS AVERAGE IS F8.3)
   24 FORMAT(1H0,9X,35HFREQUENCIES--LT 0,0--10,10--20,ETC. /
     1 1H0,5X,11F6.3)
   25 FORMAT(1H0,9X,10A6)
   26 FORMAT(1H0,9X,26HYOUR SCORE ON THIS TEST IS F5.1,8H PERCENT///)
   27 FORMAT(1H0,9X,39HTRY FOR A HIGHER SCORE ON THE NEXT TEST /////
     1 1H0,44X,27HYOUR FRIENDLY 7094 COMPUTER )
   28 FORMAT(1H1,9X,21HPROCESSING OF RESULTS ///)
   29 FORMAT(1H0,9X,40HYOUR ADJUSTED MARK IN THIS COURSE NOW IS F5.1,
     1 8H PERCENT //)
   30 FORMAT(1H0,9X,58HPUNCHING ERROR IN DATA CARD. PLEASE INFORM THE IN
     1STRUCTOR  )
   31 FORMAT(1H1,9X,30HPUNCHING ERROR IN MASTER DATA /
     1  1H0,9X,24HEXECUTION IS TERMINATED )
      END
```

```
$IBFTC DECOMS  DECK
      SUBROUTINE DECODE(CODE,B,PUNCH)
      LOGICAL B,PUNCH
      DIMENSION CODE(27),B(81),CHAR(8)
      DATA (CHAR(K),K=1,8)/1H ,1H0,1H4,1H8,1HJ,1HY,1H-,1H(/
      DO 17 K=1,27
      IF(CODE(K).NE.CHAR(1)) GO TO 10
      B(K)=.FALSE.
      B(K+27)=.FALSE.
      B(K+54)=.FALSE.
      GO TO 17
   10 IF(CODE(K).NE.CHAR(2)) GO TO 11
      B(K)=.TRUE.
      B(K+27)=.FALSE.
      B(K+54)=.FALSE.
      GO TO 17
   11 IF(CODE(K).NE.CHAR(3)) GO TO 12
      B(K)=.FALSE.
      B(K+27)=.TRUE.
      B(K+54)=.FALSE.
      GO TO 17
   12 IF(CODE(K).NE.CHAR(4)) GO TO 13
      B(K)=.FALSE.
      B(K+27)=.FALSE.
      B(K+54)=.TRUE.
      GO TO 17
   13 IF(CODE(K).NE.CHAR(5)) GO TO 14
      B(K)=.TRUE.
      B(K+27)=.TRUE.
      B(K+54)=.FALSE.
      GO TO 17
   14 IF(CODE(K).NE.CHAR(6)) GO TO 15
      B(K)=.TRUE.
      B(K+27)=.FALSE.
      B(K+54)=.TRUE.
      GO TO 17
   15 IF(CODE(K).NE.CHAR(7)) GO TO 16
      B(K)=.FALSE.
      B(K+27)=.TRUE.
      B(K+54)=.TRUE.
      GO TO 17
   16 IF(CODE(K).NE.CHAR(8)) PUNCH=.FALSE.
      B(K)=.TRUE.
      B(K+27)=.TRUE.
      B(K+54)=.TRUE.
   17 CONTINUE
      RETURN
      END
```

```
$IBJOB
$IBLDR TFMS01                                                                  TFMS0000
$TEXT  TFMS01                                                                  TFMS0001
*N *X*=7V*7V*7 0 70 70 ,0 ,0 (Z-7Y,XY-7X*,XPPY----*,(-7PPZZ,(,7(**P***)PTFMS0002
*N9,X**7V*7V*7 Z0,*-()***(**PP,XPZ0,*-((X***D)-WD3,4H-**$0(*=*,XPPZ0,*3*TFMS0003
*N8*-X*7V*7V*7 XPPZ0,*-XGX*)P)*(P****--X***)*PPPZ0,*=(X*)*P((X*)P)*(**P*TFMS0004
*N9*(X*7V*7V*7 ***$0X-,7(**(**X7X*GG*XPZZ;*9((**(P)*****PZ0,*1XGXPG*PP*GTFMS0005
*N77P-*7V*7V*7 (*(P****)**--X***)*XPZ0,*7(*P(P*(X(P*P*XX)***))GPP(*X*)PPTFMS0006
*N--(**7V*7Z=7-ZZ,*6(*P(P*(X(P**X***7-(,7***(G(**))*PX- -- -- -- -- =- 7TFMS0007
*N-)GP=7*=7*=7-- 7- 7- 7- 7- =- =- =- -- 9- 9- 9- 9- 9- 9- 9- 9- 9- 9- 9TFMS0008
*N-(P*=7*=7(*7-- 9- 9- 9- 9- 9- 9- 9- 9- 9- 90 7   74+02X-W9 90  (   74-TFMS0009
*N67P-*7(*7X*X-02X-W8 *  *  74-02X-W8 P  *  74-02X-W8 *  *7--  74+TFMS0010
*N=XP(*X(*7(*7-02X-W7 90  (   74-02X-W-  *  *7--   74+02X-W- 90  (   74-TFMS0011
*N=(X(*7**X(*7+02X-W6 *  *7--   74+02X-W= 90  (   74-02X-W=  P  P7--   TFMS0012
*N=P((*P(*X(*7-74+02X-W- 90  (7-09 *7-09 P7--4 *- 6. *9 ,4 *- 66 ,9 *4 *TFMS0013
*N7X(**X(*7(*7 7 *E *  74+02X-W- 90  X7-09 *7-09 P7--4 P- 6. *9 ,4 *- 6TFMS0014
*N-(***7(*P**7-6 ,9 *4 P7 *E *5 *   74+02X-W- 90  (   74-02X-W-  X  *7--TFMS0015
*N--(**((*7(*(  ) *  74006(-W-  X  (  *7 *5 =5 (G6956((XZ(P=  74+02X-W-TFMS0016
*N-E(P*7(*7(*X- 90  X-4*(XZG47G695 P-6PG597 P7K*74 (UZ7477-095 (XZ(X-(XZTFMS0017
*N5(WI*7(*7(*7-0677--=4*(XZG47G695 *-6*56*G59G774 *74 (4Z74-74-74 (UZ747TFMS0018
*N-(G(*7(*X(*7+4  67 9  (XZ(XZ05-(XZ(W--4P(XZG4(-4*(XZG47G695 *-6*) *   TFMS0019
*N-((V*P**7(*7-74+02X-W- 90  (  74-02X-W-  X  *  74-02X-W-  (  *7-09 *TFMS0020
*N--*(*XX*7X*X-7-0° P7--   74006(-W-  X  U  *   74002X-W- 9+  (7-0   740TFMS0021
*N7(-)*X(*7(*P-02X-W7 9+  X  7-  02X-W-  (  *7-07-*5 7  74002X-W3 9+  (TFMS0022
*N-G,**7**X(*7-7-0G5955$(XZ(X-   74002X-W- 9+  X   7- 02X-W6  *  *7-05 *TFMS0023
*N-(XP*7(*7(*7-5 *G595 P-5PD5(3 -4 *6 P9 *G5(5 -75(5 -75(5 -75(5 -5 -4 *TFMS0024
*N-(((*7(*7(*7-= *9 *G797 P7K*74 (UZ74747$=7 97$(XZ(X-5 -4 *6 *9 *G797 PTFMS0025
*N7X((*X(*X(-X-7K*74 (UZ74-47$67 97$(XZ(X-(XZ05-4 *6 *9 *  74002X-W- 9+TFMS0026
*N-P***X(*7X*X-  (4 *7-07-0   74002X-W7 9+  X   7- 02X-W-  P  *7-0G595 *TFMS0027
*N-****((*-X*7--5*  74002X-W7 9+  XG797 *7KP74 XGZ74-47 7-0(XZ(P-7-045$TFMS0028
*N-X*Z*7X*7(*7 75*E5$76X77(0 ,-5*76 77 5 -0 -G794 *74 (UZ74-5 P-7P4 P- 6TFMS0029
*N7((7*7(*7(-X-,  *9 ,4 *- 66 ,9 *4 *7 *E *4  8 *3 9G 95 -  74002X-W7 9+TFMS0030
*N--()*7(*X(*7-  XG797 P7KP74 (7Z74-47 7-0(XZ(P-7-05 ,(XZ(P-(XZ(X-   740TFMS0031
*N-PX**X(*7(*7+02X-W- 9+  X  7-  02X-W-  *  *7-04 *7 *E *4 *8 *3 77 7   TFMS0032
*N-7(X*P(*7(*(  74002X-W9 9+  XG5945*7-0(XZ(P-7-04 *8 *3 =G =   74002X-W=TFMS0033
*N4()(*7(*7(*X- 9+  XG5945R7-0(XZ(P-7-04 *8 *3 YG -4 *8 *3 Y7 -  74002XTFMS0034
*N-*X(*7(*7(-7--W- 9+  XG5945$7-0(XZ(P-7-075W0 (-6*75 5 -0 -G595 P-5P4 PTFMS0035
*N-PT,*7(*7(*7-8 P-  2 *-  6. *9 ,4 *- 66 ,9 *4 *8 *3 -G -5 -45(6 *95(TFMS0036
*N-(,**7(*7(*7-5 ((XZ(N-4 *= P9 ,4 *6 P-  7 ,6 *6 P7 *E *4 *8 *3 YG Y4 *TFMS0037
*N7(,(*((*XX*X-9 *  74002X-W7 9+  (4 *7-07-0  74002X-W- 9+  (7-0(XZ06-TFMS0038
*N-$(**7X*XX*X-4 *7 *E *   74002X-W7 9+  ,7-0   74002X-W- 9+  X   7- 02XTFMS0039
*N-(X(*7(*7(*P--W-  *  *7-0   74002X-W- 9+  (4 *7-07-0  74002X-W7 9+  (TFMS0040
*N-*(--X(*((*(    7- 02X-W-  (  *7-05 =   74002X-W7 9+  (7-0   7400 Y-W-TFMS0041
*N7()(-7V*7(*7-0  0 =77 77 75 76 74 - =G--549   7 =7--G9-74*74-767759778TFMS004
*N-((*M7Z*7V*7 7797 -0 ,- 9      0 *   *)9  =  7  7  -P  7N *- P   - 1 TFMS0043
*W-=)R*7VX  - S *  (((PP*  9  =                                          -TFMS0044
$CDICT TFMS01                                                                  TFMS0045
*N ***-V  1-*)9-V-(((  ***-6 (X*-6 (**-6 (*(-6 (**-6 (*)-6 XD-- (-(-)--TFMS0046
*09*(7(**-  XD--  (*)-  P*)-                                                   TFMS0047
$DKEND TFMS01                                                                  TFMS0048
$IBLDR DECOMS                                                                  DECO0000
$TEXT  DECOMS                                                                  DECO0001
*N G(-=7*=7V*2-0 70 70 -0 -0 -- 6- 90 -0 70 -PPP7PP7PPXPPPPPXPPXPPXPP0 7DECO0002
*N9()**7V*7X*7-G6946 8 -3 -5 -56 56 56 5 746 8 -3 -5 -)6 56 56 5 746 8 -DECO0003
*N8-G,*7X*7(*7 3 -5 -56 )6 56 5 746 8 73 -5 -56 56 )6 5 746 8 -3 -5 -)6 DECO0004
*N9()-*7(*7(*7-)6 5( 5 746 8 -3 -5 -)6 56 )6 5 746 8 -3 95 -56 )6 )6 5 7DECO0005
*N7X()*7V*XV*7-46 8 73 =5  )6 )6 )6 (XZ(G-5 R0  0 -76 74 - -G40549   7 -DECO0006
*N-*)P*7V*7(*7-740G 074-74876944976 (XZ76-76-76-76-76-76-76-76-44776 (XZDECO0007
*N--*,*7(*X(*7-76-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ76-DECO0008
*N-(*)*X(*7(*X-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ7690WZDECO0009
```

```
*M6,X(*7(*6V-7 769 WZ769(WZ76=0WZ76=0WZ76=44-- 60 -      0 -    **)      DEC00010
$CDICT DECOMS                                                          DEC00011
*0 (X(8/  1-**)8/ ***   P*)-                                           DEC00012
$DKEND DECOMS                                                          DEC00013
$DATA
GEOLOGY 116,TERM 1,TEST 1  CHAPTER 1 OF TEXT. OCT 7 1965.
THE FOLLOWING IS MY ANALYSIS OF YOUR TRUE/FALSE ANSWERS.
I CANNOT DO PSYCHO-ANALYSIS, BUT I CAN DEDUCE THAT
IN KNOWLEDGE OF PHYSICAL TERMS AND PRINCIPLES,
IN KNOWLEDGE OF CHEMICAL CONCEPTS AND SYMBOLS,
IN UNDERSTANDING CONCEPTS ABOUT CRYSTALS,
IN RETENTION OF DATA ON MINERALS,
YOU ARE IN TROUBLE. DID YOU READ THE TEXT.
YOU ARE VERY POOR. STUDY CHAPTER 1 BEFORE THE NEXT TEST.
YOU ARE POOR. I SUGGEST THAT YOU REREAD CHAPTER 1.
YOU ARE FAIRLY POOR. YOU SHOULD REVIEW CHAPTER 1.
YOU ARE ONLY FAIR. MORE ATTENTION TO DETAILS WOULD HELP.
YOU ARE FAIRLY GOOD. YOU SHOULD SCORE HIGHER IN NEXT TEST.
YOU ARE GOOD. THE NEXT TEST SHOULD BE A PIECE OF CAKE.
YOU ARE VERY GOOD. IS THE TEXT TOO SIMPLE FOR YOU.
YOU ARE EXCELLENT. HOW ABOUT REVISING CHAPTER 1.
YOU ARE NEARLY PERFECT. WOW.
YOU HAVE A TENDENCY TO DISBELIEVE STATEMENTS EVEN WHEN TRUE.
YOU HAVE A TENDENCY TO BELIEVE STATEMENTS EVEN WHEN FALSE.
YOU HAVE NO MARKED TENDENCY TO REJECT OR ACCEPT STATEMENTS.
 81  3
1.0     0.0
 8Y4- -Y (04Y(4Y 48 ((4(0Y-
0.3     0.7     0.0     0.0
0.6     0.4     0.0     0.0
0.2     0.3     0.0     0.5
0.8     0.2     0.0     0.0
0.6     0.4     0.0     0.0
0.9     0.1     0.0     0.0
0.1     0.0     0.9     0.0
0.3     0.3     0.4     0.0
0.8     0.2     0.0     0.0
0.0     0.0     0.8     0.2
0.0     0.0     0.1     0.9
0.2     0.0     0.8     0.0
0.1     0.7     0.2     0.0
0.0     0.3     0.0     0.7
0.0     0.0     0.8     0.2
0.0     0.3     0.0     0.7
0.2     0.8     0.0     0.0
0.7     0.3     0.0     0.0
0.0     0.0     0.2     0.8
0.2     0.8     0.0     0.0
0.4     0.0     0.6     0.0
0.1     0.7     0.2     0.0
0.2     0.8     0.0     0.0
0.1     0.9     0.0     0.0
0.0     0.0     0.1     0.9
0.2     0.8     0.0     0.0
0.0     0.1     0.0     0.9
0.0     0.3     0.0     0.7
0.2     0.8     0.0     0.0
0.0     0.6     0.4     0.0
0.0     0.6     0.4     0.0
0.0     0.6     0.0     0.4
```

0.2	0.8	0.0	.0
0.5	0.5	0.0	0.0
0.0	0.0	0.6	0.4
0.0	0.2	0.8	0.0
0.7	0.2	0.1	0.0
0.9	0.1	0.0	0.0
0.8	0.2	0.0	0.0
0.6	0.4	0.0	0.0
0.8	0.2	0.0	0.0
0.8	0.2	0.0	0.0
0.7	0.3	0.0	0.0
0.8	0.2	0.0	0.0
0.0	0.6	0.0	0.4
0.9	0.1	0.0	0.0
0.0	0.5	0.0	0.5
0.0	0.4	0.0	0.6
0.0	0.4	0.0	0.6
0.0	0.2	0.4	0.4
0.0	0.2	0.8	0.0
0.0	0.4	0.0	0.6
0.2	0.0	0.6	0.2
0.1	0.9	0.0	0.0
0.8	0.2	0.0	0.0
0.2	0.8	0.0	0.0
0.2	0.8	0.0	0.0
0.1	0.9	0.0	0.0
0.0	0.2	0.0	0.8
0.0	0.7	0.0	0.3
0.0	0.1	0.0	0.9
0.0	0.8	0.0	0.2
0.6	0.4	0.0	0.0
0.7	0.3	0.0	0.0
0.8	0.2	0.0	0.0
0.2	0.8	0.0	0.0
0.6	0.4	0.0	0.0
0.6	0.4	0.0	0.0
0.9	0.1	0.0	0.0
0.1	0.9	0.0	0.0
0.2	0.8	0.0	0.0
0.0	0.0	0.9	0.1
0.0	0.1	0.0	0.9
0.0	0.3	0.0	0.7
0.8	0.0	0.0	0.2
0.0	0.6	0.0	0.4
0.0	0.6	0.0	0.4
0.0	0.4	0.0	0.6
0.9	0.1	0.0	0.0
0.3	0.7	0.0	0.0
0.0	0.5	0.0	0.5

U YUB4(U840401 Y 40U8U4Y(0 WAIN, M. II MOD. HIST. VIC
8YU- -U - 4Y(Y -Y ((4-0YYWYLIE,LYNDA MARION I SOC+PHIL NC
88(4 -(4U0-Y-4Y -84((4(088YOUNG, ELIZABETH K. I SOC+PHIL VIC

INDIVIDUAL REPORT

WAIN, M. II MOD. HIST. VIC

GEOLOGY 116, TERM 1, TEST 1 CHAPTER 1 OF TEXT, OCT 7 1965.

YOUR SCORE ON THIS TEST IS 33.3 PERCENT

THE FOLLOWING IS MY ANALYSIS OF YOUR TRUE/FALSE ANSWERS.

IN KNOWLEDGE OF PHYSICAL TERMS AND PRINCIPLES,

YOU ARE ONLY FAIR. MORE ATTENTION TO DETAILS WOULD HELP.

IN KNOWLEDGE OF CHEMICAL CONCEPTS AND SYMBOLS,

YOU ARE FAIRLY POOR. YOU SHOULD REVIEW CHAPTER 1.

IN UNDERSTANDING CONCEPTS ABOUT CRYSTALS,

YOU ARE POOR. I SUGGEST THAT YOU REREAD CHAPTER 1.

IN RETENTION OF DATA ON MINERALS,

YOU ARE POOR. I SUGGEST THAT YOU REREAD CHAPTER 1.

I CANNOT DO PSYCHO-ANALYSIS, BUT I CAN DEDUCE THAT

YOU HAVE NO MARKED TENDENCY TO REJECT OR ACCEPT STATEMENTS.

YOUR ADJUSTED MARK IN THIS COURSE NOW IS 33.3 PERCENT

TRY FOR A HIGHER SCORE ON THE NEXT TEST

YOUR FRIENDLY 7094 COMPUTER

INDIVIDUAL REPORT

DUNLEVIE, LINDA I SCC+PHIL UC

GEOLOGY 116,TERM 1,TEST 1 CHAPTER 1 OF TEXT, OCT 7 1965.

YOUR SCORE ON THIS TEST IS 55.6 PERCENT

THE FOLLOWING IS MY ANALYSIS OF YOUR TRUE/FALSE ANSWERS.

IN KNOWLEDGE OF PHYSICAL TERMS AND PRINCIPLES,

YOU ARE VERY GOOD. IS THE TEXT TOO SIMPLE FOR YOU.

IN KNOWLEDGE OF CHEMICAL CONCEPTS AND SYMBOLS,

YOU ARE GOOD. THE NEXT TEST SHOULD BE A PIECE OF CAKE.

IN UNDERSTANDING CONCEPTS ABOUT CRYSTALS,

YOU ARE VERY POOR. STUDY CHAPTER 1 BEFORE THE NEXT TEST.

IN RETENTION OF DATA ON MINERALS,

YOU ARE FAIRLY POOR. YOU SHOULD REVIEW CHAPTER 1.

I CANNOT DO PSYCHO-ANALYSIS, BUT I CAN DEDUCE THAT

YOU HAVE NO MARKED TENDENCY TO REJECT OR ACCEPT STATEMENTS.

YOUR ADJUSTED MARK IN THIS COURSE NOW IS 55.6 PERCENT

TRY FOR A HIGHER SCORE ON THE NEXT TEST

YOUR FRIENDLY 7094 COMPUTER

INDIVIDUAL REPORT

FEDYK,NESTOR II PSY VIC

GEOLOGY 116,TERM 1,TEST 1 CHAPTER 1 OF TEXT, OCT 7 1965.

YOUR SCORE ON THIS TEST IS 77.8 PERCENT

THE FOLLOWING IS MY ANALYSIS OF YOUR TRUE/FALSE ANSWERS.

IN KNOWLEDGE OF PHYSICAL TERMS AND PRINCIPLES,

YOU ARE NEARLY PERFECT. WOW.

IN KNOWLEDGE OF CHEMICAL CONCEPTS AND SYMBOLS,

YOU ARE VERY COOL. IS THE TEXT TOO SIMPLE FOR YOU.

IN UNDERSTANDING CONCEPTS ABOUT CRYSTALS,

YOU ARE EXCELLENT. HOW ABOUT REVISING CHAPTER 1.

IN RETENTION OF DATA ON MINERALS,

YOU ARE FAIRLY GOOD. YOU SHOULD SCORE HIGHER IN NEXT TEST.

I CANNOT DO PSYCHO-ANALYSIS, BUT I CAN DEDUCE THAT

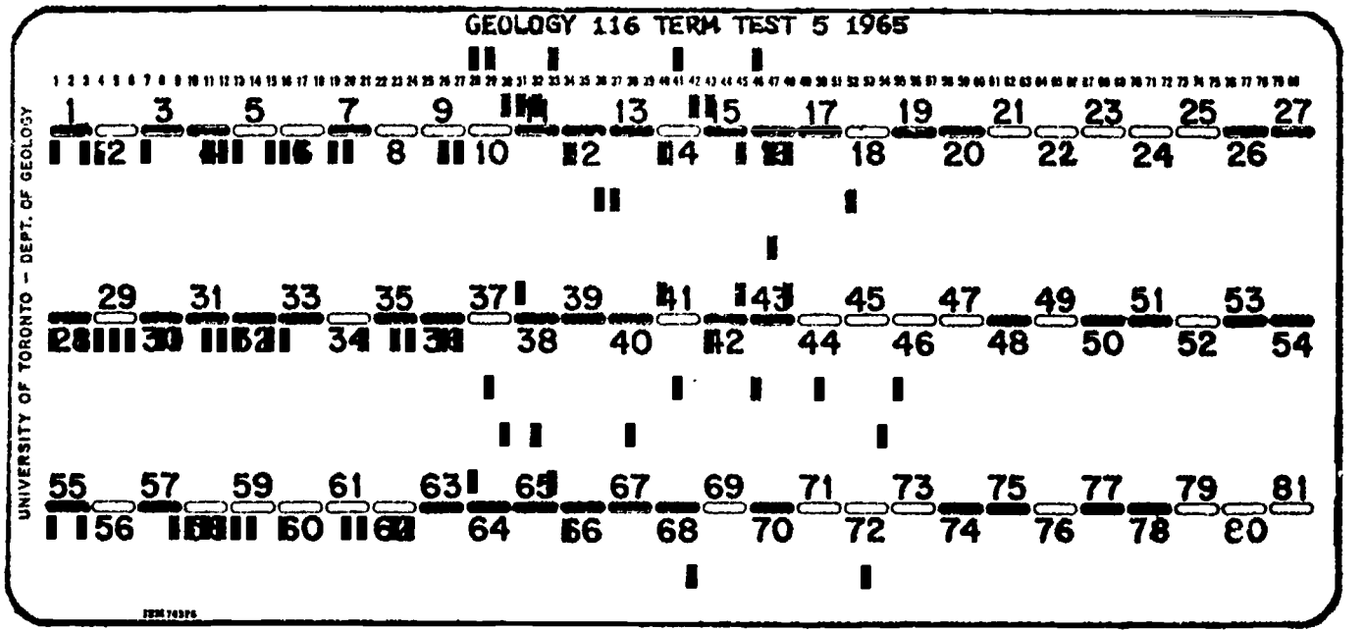
YOU HAVE NO MARKED TENDENCY TO REJECT OR ACCEPT STATEMENTS.

YOUR ADJUSTED MARK IN THIS COURSE NOW IS 77.8 PERCENT

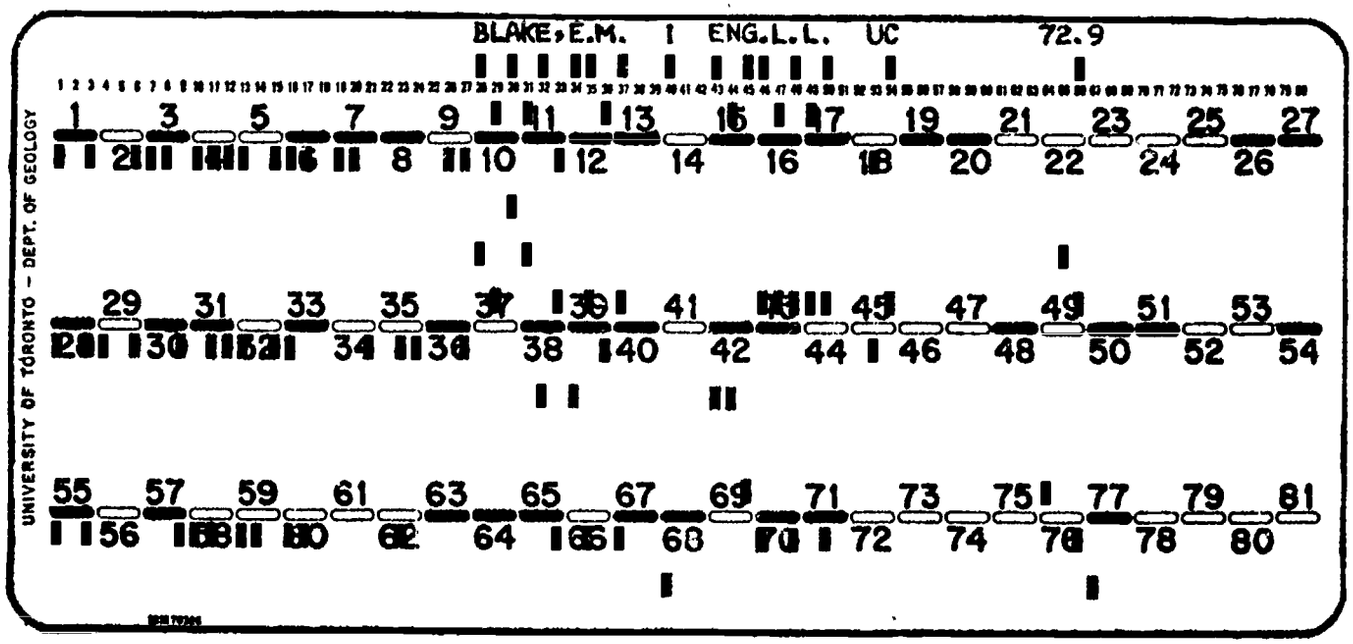
TRY FOR A HIGHER SCORE ON THE NEXT TEST

YOUR FRIENDLY 7094 COMPUTER

Addenda. A typical MS card, marked by the supervisor, punched, and ready for duplication, is shown below.



A typical MS card, marked by a student taking the test, punched, and ready for duplication, is shown below.



University of Toronto
Department of Geology
R.K. Option--Geology 116
Term Test 1--Chapter 1 of Text(Eardley)--Oct. 7, 1965.

The following statements should be considered to be either true or false but not both, and also not undeterminable. Unless indicated otherwise by the context, the conjunction or means inclusive or. The information as given in the text should be considered to be correctly stated for the purposes of this test, even if you have good grounds for doubt. Remember: mark the data card if true, leave blank if false.

1 An atom of oxygen weighs 16.0 grams.
2 None of the chemical elements that occur in minerals are radioactive.
3 Some minerals are radioactive.
4 The nuclei of all of the chemical elements contain protons and neutrons.
5 Isotopes are chemical elements with the same valency.
6 An electron has over 1000 times the mass of a neutron.
7 There are over 2000 known crystal systems.
8 Ionic bonding in crystals is essentially electrostatic.
9 Water is the only known liquid that has a boiling temperature at atmospheric pressure.
10 If a mineral has cubic crystal symmetry or cubic cleavage, then its constituent atoms or ions must be arranged in a cubic pattern.
11 Apart from the core, most of the earth is composed of crystalline minerals.
12 Some glasses are crystalline, and others are amorphous.
13 Covalent bonds are, in general, stronger than ionic bonds.
14 The ideal composition of quartz is SiO_2.
15 The pyritohedral crystal faces of pyrite have six edges.
16 All feldspar minerals contain silicon as an essential component.
17 A dynamic equilibrium is one that is unstable.
18 Oxygen has only one isotope of mass number 16.
19 Quartz has cubic cleavage.
20 Some ions are electrically neutral.
21 The text shows an illustration of an x-ray diffraction pattern.
22 The atoms in some minerals are linked by covalent bonds.
23 An ion is an atom that has gained or lost a proton.
24 Some ions can chemically combine with protons.
25 Corundum is the name of a mineral, not of a rock.
26 Sublimation may be a psychological term, but is is also a chemical term.
27 Some minerals are unknown in nature.
28 The carbonate minerals are silicates.
29 Covalent bonds do not involve the valence electrons.
30 All crystals are composed only of ions.
31 Some kinds of crystals are composed only of molecules.
32 Feldspars contain aluminium as an essential component.
33 Deuterium is an isotope of helium.
34 Some isotopes of hydrogen have two or more neutrons in their nuclei.
35 Atoms or ions in minerals are not always arranged in a regular three-dimensional pattern.
36 Crystals cannot be made by humans.
37 Diameters of single atoms or ions are approximately 0.00000001 centimeters.

38 Neutrons are negatively charged particles.
39 The material between the atoms in a gas is not called plasma.
40 A mass spectrometer is used to split the nucleus of atoms.
41 Helium atoms are not the smallest atoms known.
42 One proton and one electron make up an atom of hydrogen.
43 Isotopes are those chemical elements that have no neutrons in their nuclei.
44 All of the radioactive elements have the same expected half-life period.
45 Uranium obtained from mineral sources is radioactive.
46 Gamma rays are streams of electrons.
47 By weight, the most abundant element in rocks is silicon.
48 Pyrite is a sulphide mineral.
49 Feldspar minerals are silicate minerals.
50 A tetrahedral arrangement of oxygen around silicon is part of the crystal structure of all silicate minerals.
51 Crystals of metals such as copper are described in the text as being an orderly packing of atoms.
52 The ideal composition of calcite is KCl.
53 Crystals diffract x-rays whereas minerals do not diffract x-rays.
54 Most of the universe is composed of hydrogen.
55 Atoms cannot be broken down into smaller particles.
56 Tritium is an isotope of hydrogen.
57 Deuterium is an isotope of hydrogen.
58 Quadrium is an isotope of hydrogen.
59 Gypsum is a sulphate mineral.
60 All sulphate minerals are also silicate minerals.
61 Hornblende is a silicate mineral.
62 In the crust of the earth, aluminium is more abundant than sodium by weight.
63 Alpha and beta rays from radioactive elements are composed of positive and negative electrons.
64 Uranium becomes measurably lighter during radioactive decay to lead.
65 Radioactive decay of uranium is too uncertain a process to be used in a geological timing method.
66 Lithium has a chemical valency of (+2).
67 An isotope symbolized as ${}_{8}O^{17}$ means that the neutral atom has 8 electrons outside the nucleus.
68 An isotope symbolized as ${}_{8}O^{17}$ means that its nucleus contains 9 neutrons.
69 Water must be heated to a higher temperature on a mountain than at sea level, before boiling takes place in an open pot.
70 The valence of chlorine, bromine, and iodine is (-1).
71 Two atoms of the same element cannot combine to form a bonded compound.
72 All crystals of halite are perfectly cubical in shape.
73 There are over 2000 known kinds of minerals.
74 Minerals with the same name have exactly the same composition.
75 The petrographic microscope uses polarized light in the study of rocks and minerals.
76 Some minerals crystallize from aqueous solutions.
77 All minerals crystallize from fusions.
78 Magnetite is an iron oxide mineral.
79 An electron microscope is used to study the electron structure of atoms.
80 A liter of oxygen is heavier than a liter of hydrogen.
81 Water is an essential constituent of gypsum.